DOCUMENT RESUME

ED 371 945 SE 054 607

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TITLE Defining Environmental Education. Workshop Resource Manual.
INSTITUTION Michigan Univ., Ann Arbor. School of Natural Resources.
SPONS AGENCY Environmental Protection Agency, Washington, D. C.
REPORT NO ISBN-1-884782-03-5
PUB DATE 94
CONTRACT EPA-G-NT901935-01-0
NOTE 47p.; For other booklets in the series, see SE 054 608-611.
AVAILABLE FROM National Consortium for Environmental Education and Training, Dana Building, 430 E. University Ave., Ann Arbor, MI 48109-1115.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052) -- Books (010)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Elementary Secondary Education; *Environmental Education; *Inservice Teacher Education; Learning Activities; Program Development; *Teacher Education Programs; *Teacher Workshops; Teaching Guides; Units of Study
IDENTIFIERS *Environmental Education Programs; *Environmental Issues

ABSTRACT

This booklet is one in a series of resource manuals to help teacher educators conduct environmental education (EE) teacher workshops or promote EE programs. This unit is an orientation to the field of EE. It offers a definition of EE and some ways to explain its value to educators and environmental managers. The unit explains current and historical notions of what children need to learn and how they can be taught if they are to become environmental problem solvers. The unit is presented in six sections that describe: (1) the essence of EE; (2) the value of EE; (3) the evolution of EE from the classic interpretation to the contemporary view of EE; (4) current EE issues in the school; (5) activities and masters for teaching the unit; and (6) a list of 14 resources. The activities make up the majority of the booklet and offer suggestions to help teacher educators conduct workshops that give teachers an understanding of the objectives of EE and how these might be translated into the curricula. (MDH)

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Defining Environmental Education

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The Environmental Education Toolbox

EE Toolbox—
Workshop Resource Manual

Defining Environmental Education

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This project has been funded by the United States Environmental Protection Agency under assistance agreement number EPA-G-NT901935-01-0 to the University of Michigan School of Natural Resources and Environment.

NCEET

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ISBN 1-884782-03-5

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Printed on paper containing 50% total recycled fiber/25% post-consumer fiber using soy-based ink.

Designed by Margaret Re
Typeset in Sabon,
News Gothic, and Franklin
Gothic Number 2

Contents

Introduction 2

I The Essence of EE 3
- In a Nutshell 3
- Environmental Literacy 5
- Responsible Environmental Behavior . . . 7

II The Value of EE 8
- From the Educational Perspective 8
- From the Environmental Perspective 9

III From the Classic to the Contemporary 10
- The Roots of EE 10
- Societal Influences and Trends 11

IV Current EE Issues in our Schools 12
- Everyone's Concern 12
- Secondary Schools 12
- Science 12
- Issues and Problem-Solving Skills 13
- Urban Issues 13

V Activities and Masters 15

VI Resources 39

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Workshop Scene

A hush fell over the middle school teachers as Ms. Garcia, an earth science teacher, stood to present her group's definition of *environmental education*:

> *"Environmental education is concerned with the ways people influence the natural world. It entails the study of organisms—including humans—in their physical and biological surroundings, and requires an understanding of the processes of energy and material cycling. It further requires that students understand how their own behavior affects the quality of the environment."*

Murmurs of agreement and nodding heads seconded the small group's stab at a definition. Other teams of workshop participants built on that definition emphasizing social issues and describing a "quality environment." Chris, the workshop leader, acknowledged that these new definitions are similar to those used by EE curriculum developers and authors. But the workshop participants were not done with their task. Chris continued by challenging the groups to come up with a description of *a citizen who takes care of the environment*. A few puzzled looks greeted him, then the teachers turned to their colleagues and began to talk. When the groups came together a second time, Mr. Cohen offered the following:

> "*A citizen who takes care of the environment* values nature and natural processes. He/she can identify the environmental issues in the local and global community. He/she knows the causes of environmental problems and how to take action to find solutions. He/she feels responsible for the environment."

Chris congratulated the groups on their fine work and displayed the two definitions on newsprint side by side. He then asked, "To what extent does the process in the first definition result in the person described in the second definition? Which of these better describes what we should work toward?" Chris was satisfied that the group was considering some of the key issues even though they couldn't come to complete agreement.

As a workshop facilitator, you may have opportunities to guide teachers through a process by which they become more familiar with the goals and objectives of EE and work on developing their own working definition—one that will provide guidance as they augment their lessons, choose activities, and design units around environmental concepts. You can use a variety of workshop strategies to provide this information. The rest of this unit offers several suggestions about background information and activities for workshop participants.

Introduction

ENVIRONMENTAL EDUCATION (EE) offers classroom teachers a rich and diverse array of meaningful activities and opportunities. The richness comes from addressing topics that fall between subject areas (often science and social studies). The meaningfulness results from addressing events, issues, observations, and phenomena that are important to youngsters. Typical activities might include observing the pecking order at a bird feeder or mapping water from the river to the kitchen sink and back again. But teachers can also "do EE" when they teach argumentation skills to debate a local land use issue, ask math students to calculate the volume of used diapers in the landfill, or investigate Native American lifestyles through historical literature. EE can enhance English, math, or history classes; it can include a study of pigeons, soil chemistry, or federal legislation. It can happen in the city, the cemetery, or the circuit court. And it can involve controversial issues.

It's a little different style of teaching: You have to be open and willing to move from one thing to another. Once you get involved, you find a whole new joy in teaching, and the students are thriving as well.

John Scheer, middle school teacher in Springfield, MO

But EE is not just a topic; its goals include more than learning information. EE is driven by a mission: to produce a concerned citizenry that is intellectually and psychologically prepared to confront and resolve environmental issues.

Most educators decide to teach about the environment because they understand there are urgent and critical problems to be solved. Most of these issues are complex and controversial. Even if an educator wants to convince students of the "right" answer, EE must maintain a firm commitment to the process of problem solving and evaluating information from different perspectives. To help resolve environmental problems, particularly those that will challenge citizens 50 years from now, people need a combination of knowledge, attitudes, motivations, skills, and commitment. EE in our schools includes the lessons and exercises that help students gain all of these attributes. And as a result, EE is often credited with improving teachers' interest and ability in teaching. EE is sometimes called "good education."

As a teacher educator, you may define EE differently for various audiences; this unit will help you. From the environmental perspective, there are some distinct and valuable contributions that EE can make (see p. 9). Similarly, from the educational viewpoint, there is another set of good reasons for teachers to embrace EE (see p. 8). Because history often makes a good background for explaining trends and answering questions, this unit briefly reviews the origins of EE (pp. 10–11) and concludes with a few challenges (pp. 12–13).

The Essence of Environmental Education

I

SINCE THE 1970S, environmental education has been characterized as a way of teaching that makes connections between science, technology, economics, policy, people, and the environment. EE is fundamentally different from earlier versions of "nature education" because it addresses interrelationships between humans and the environment. It also differs from environmental science—the scientific study of those interrelationships—because EE is concerned with values and skills as well as knowledge.

In a Nutshell

The following points characterize EE as it is practiced in the United States.

1

EE includes a human component in the exploration of environmental problems and solutions

Environmental solutions are not only scientific—they include historical, political, economic, cultural, and many other perspectives. This also implies that the environment includes not only pine trees and coyotes but also buildings, highways, and ocean tankers. Activities 2–5 can be used to discuss this idea.

2

EE rests on a foundation of knowledge about social and ecological systems

Knowledge lays the groundwork for analyzing environmental problems, resolving conflicts, and preventing new problems from arising. Activities 5 and 10 focus on this aspect.

3

EE includes the affective domain: the attitudes, values, and commitments necessary to build a sustainable society

The role for educators in addressing the affective domain is not always easy, but it should include clarifying that differing personal values exist, that these values make it difficult to derive the facts, and that controversy is often motivated by differing value systems. Activities 6, 7, and 8 can help teachers see this point.

4

EE includes opportunities to build skills that enhance learners' problem-solving abilities

These skills may include:

- Communication: listening, public speaking, persuasive writing, graphic design
- Investigation: survey design, library research, interviewing, data analysis
- Group process: leadership, decision making, cooperation

Activities 9 and 10 can help you demonstrate these skills with teachers.

Some Connections to Education Reform

Waves of reform efforts are sweeping the country in various strengths and directions. EE may be an effective vehicle for implementing the goals of education reform, in particular, because it shares with EE a great similarity of purpose and outcome. In many states, the attention to real-world problems and problem-solving skills provides an excellent niche for EE. In others, a learner-centered discovery process of teaching can be enhanced with EE instructional materials. Below are two examples of strong connections to EE that may not be automatically made by educators[1].

Higher-Order Skills

EE could further the development of higher-order skills—such as critical thinking, creative thinking, integrative thinking, and problem solving—because it readily provides real problems that can be studied or simulated, topics that can be adjusted to the developmental levels of specific groups of students, and problems that cut across the curriculum.

"Teaching students to think" has been a basic goal of education. One translation of this goal is the ability to understand and analyze complex information and apply it to new situations. Those concerned with maintaining and improving environmental quality have a particular stake in developing educational mechanisms that help students understand interrelationships between the natural environment and human activity—economic, social, and political—and how problems are solved. Thus, EE provides one context for the development of higher-order thinking and learning skills.

Citizenship Education

A consistent assumption has been that solutions to society's environmental problems, complex as they may be, will be facilitated if everyone knows more and can do more when it comes to the environment. Thus, a compelling rationale for EE is simply to provide general "citizenship" education. With a good environmental education, it is hoped that citizens will behave more positively toward the environment; actively lessen their individual and collective negative environmental impacts; and identify, initiate, and support measures that will serve to resolve environmental problems. Such a program is likely to provide opportunities for students to practice the skills of responsible citizenship as they learn how citizens can take a role in helping to solve local environmental problems. EE also provides technical education for those who will make a career in the environmental arena; the assumption is that expertise, built from research and application, provides the essential keys to solving environmental problems. Each of the above assumptions may be somewhat simplistic, though a good deal of evidence indicates that both can significantly improve the quality of life and the environment.

Although the particular mix of developments that prompted the emergence of EE in the United States is unique to this country, similar social, scientific, and ecological phenomena were taking place around the world. Like the United States, many other nations have realized the need for EE, and a fertile interaction has enhanced the development of EE globally. The United Nations coordinated a series of meetings from 1974 through 1978 to establish an international definition of environmental education.

Delegates assembled at the 1977 United Nations Intergovernmental Conference in Tbilisi, Georgia, USSR, agreed upon the following definition of EE:

> ***Environmental education is a process of developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, skills, attitudes, motivation and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.***
> (Unesco, 1978)

Clearly embedded in this definition is the unique distinction that EE fosters involvement of citizens in solving environmental problems. The extent to which this involvement should be orchestrated by the teacher has made for interesting and lively debate among theorists and practitioners.[2] Of course, teachers in most schools have the prerogative, if not the mandate, to modify children's behavior so they do not cheat, lie, or steal. In communities where recycling is mandatory, teachers are also encouraged to instill this new environmental behavior in their students. But will society sanction an approach that encourages students to study, analyze and *act on* their analysis of more controversial issues? Where the community has not yet agreed upon a particular behavior or solution, the actions of young people are, unfortunately, likely to be taken as the result of a teacher's one-sided approach to the issue (Adler, 1992; Poore, 1993). Suggestions for ways teacher educators can help teachers engage their students in exploring issues are presented in another *Workshop Resource Manual* unit, "Approaching Issues in the Classroom."

The conference at Tbilisi also produced 12 statements, referred to as the Guiding Principles of Environmental Education (page 6). These statements speak to the development of a process that is more far-reaching than formal K–12 education and to an audience that includes citizens, adults, and environmental professionals (Unesco, 1978).

Educators, philosophers, researchers, and curriculum developers have worked over the last 20 years to set these Guiding Principles in motion. In the United States, several themes have been emphasized in the development of materials for students, teachers, and citizens; two of which are described below.

Environmental Literacy

Today, the creation of an environmentally literate citizenry is considered a primary goal of environmental education.[1] Some will argue that environmental literacy is a necessary prerequisite for the development of responsible environmental behavior and improved environmental quality. However, "environmental literacy" does not mean the same thing to everyone. Although the term has been frequently discussed over several decades, it seems to merely create a positive image and fails to convey much substance.

A new ethic, embracing plants and animals as well as people, is required for human societies to live in harmony with the natural world on which they depend for survival and well-being.

World Conservation Strategy, 1980

A distinguishing characteristic of environmental literacy is its "action" perspective: environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems.

The Guiding Principles of Environmental Education

Environmental education should:

1. Consider the environment in its totality—natural and built, technological and social (economic, political, cultural, historical, moral, aesthetic);
2. Be a continuous lifelong process, beginning at the preschool level and continuing through all formal and nonformal stages;
3. Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
4. Examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas;
5. Focus on current and potential environmental situations, while taking into account the historical perspective;
6. Promote the value and necessity of local, national and international cooperation in the prevention and solution of environmental problems;
7. Explicitly consider environmental aspects in plans for development and growth;
8. Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
9. Relate environmental sensitivity, knowledge, problem-solving skills, and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
10. Help learners discover the symptoms and real causes of environmental problems;
11. Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
12. Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment, with due stress on practical activities and first-hand experience.

According to Roth (1992), environmental literacy should be defined in terms of observable behaviors. That is, people should be able to demonstrate in some observable form what they have learned—their knowledge of key concepts, skills acquired, disposition toward issues, and the like. Most other literacies are defined in terms of cognition. Though knowledge is deemed a necessary precondition of thoughtful behavior and action, a great deal of evidence of individual and societal environmental behavior challenges the assumption that behavioral change follows directly from the development of necessary knowledge and skills.

Responsible Environmental Behavior

As stated earlier, the environmental education community's identification of skills and values related to behavior change as an integral component of environmental literacy puts it at odds with traditional educational practice. A substantive framework for promoting responsible environmental behavior has been proposed by researchers at Southern Illinois University.[4] This framework involves four distinct levels, each of which contributes to developing environmental behavior (Hungerford, Peyton, and Wilke, 1980).

Level 1: Ecological Concepts includes a broad framework of environmental science and ecological concepts, such as population dynamics, biogeochemical cycling, and abiotic influences. Other educators may add companion goals in political, economic, psychological, and social concepts.

Level 2: Conceptual Awareness builds an understanding of how individual and collective behavior influences the relationship between quality of life and quality of environment, as well as how human behavior results in issues that must be resolved through insightful problem solving.

Level 3: Issue Investigation and Evaluation develops the knowledge and skills needed to investigate environmental issues and to evaluate alternative solutions for remediating them.

Level 4: Environmental Action Skills develops the knowledge and skills needed to take positive action to resolve environmental issues.

Research studies consistently indicate that behavior change does not usually occur if students are exposed only to the first two goal levels. Studies indicate that behavior is more likely to change if students are thoroughly exposed to all four. The quality of the students' environmental actions also tends to improve when they have been directly involved with their own investigations (at levels 3 and 4). It is clear that more emphasis needs to be placed on the development and dissemination of curricula that focus on the full range of goals, in particular the third and fourth ones.

Researchers in other disciplines claim that two other areas hold great promise for making significant contributions to the promotionof environmentally responsible behavior: social marketing techniques, such as careful audience assessment, understanding the motivations of the audience, and altering the program service dimensions (Azjen and Fishbein, 1970; Geller, 1989; Kotler and Roberto, 1989) and principles of environmental psychology (DeYoung, 1993; Katzev and Johnson, 1987; Stern and Oskamp, 1987). These principles include understanding the full range of motives available for behavior change, removing real and perceived barriers to change, providing procedural information, establishing social commitment, highlighting the actions of opinion leaders and role models, and avoiding approaches that can trigger unwanted reactions. To the extent these elements are included in an educational program or information campaign, efforts at encouraging environmental behaviors are enhanced.

The conservation question is a question of right and wrong. It is a moral issue because it involves the rights and duties of our people—their rights to prosperity and happiness, and their duties to themselves, to their descendents, and to the whole future progress and welfare of this Nation.

Gifford Pinchot, 1910
The Fight for Conservation

II

The Value of Environmental Education

THERE ARE MANY REASONS, from both environmental and educational perspectives, for supporting environmental education in K–12 schools.[1] The school systems that you work with may share some of these goals, whether or not they have been formally stated. How many of these statements fit your circumstances? With how many of them do workshop participants agree? You may be able to add to the following list.

A day in the mountains is worth a mountain of books.

John Muir

From the Educational Perspective

Environmental issues are by nature interdisciplinary and ideal vehicles for educators developing multidisciplinary teaching teams.

Landfill siting, nest boxes for endangered birds, homeless shelters, hunger, household hazardous waste collections, and improved trail signage are some topics and activities that could support an interdisciplinary study.

The outdoors is a powerful supplement to textbooks, providing engaging, concrete material.

Insects, leaves, sunshine, rain, streams, and soil are usually accessible to teachers and will help students grasp concepts that may be nebulous in the text.

EE emphasizes the skills and strategies needed to solve problems.

EE programs teach students to make decisions, analyze, and evaluate complex problems—skills critical to success in any meaningful endeavor.

Environmental issues are rarely solved by individuals.

Effective EE programs use cooperative learning techniques to help students learn to work together, share leadership, listen to peers, and contribute to group projects.

Environmental education involves values education.

Whether clarifying positions or debating prospective solutions to moral dilemmas, EE activities give students an opportunity to develop their ideas of right and wrong and to accept the many "gray" areas created by different points of view.

From the Environmental Perspective

With the conviction that comes from their investigation of an issue, students may provide positive, responsible energy and useful alternatives to local problems.

Kid Heroes of the Environment documents actions that students have taken and for which they have won the gratitude of their communities (Dee, 1991).

Good EE programs can be positive and productive aspects of communities.

By encouraging people to work together, learn about their environment, understand differences, perform leadership functions, and solve problems, EE will make communities better places to live, now and in the future, when these same students take leadership roles.

EE programs that focus on the natural and historical heritage of this continent engender patriotism, inspiration, respect for America's past, and belief in the nation's future.

Americans are naturally motivated to protect priceless treasures like the Grand Canyon, Mesa Verde, Gettysburg, and the cotton mills of Lowell, Mass.

In the future, improvements in environmental quality are likely to be driven more by consumer choice and less by legislative mandate.

Consumers educated in today's schools will decide how to consider the environmental impact in their choices of lawn mowers, outdoor grills, light bulbs, refrigerators, and modes of transportation. EE can influence lifestyle choices and foster responsible citizenship.

A high-quality EE program will affect the types of careers young people pursue and the quality of workers who enter environmental fields.

Job and career opportunities associated with the environment span the spectrum from manual labor to high-technology; they represent a significant avenue for low-income individuals to gain access to skilled jobs with good pay (Task Force, 1989).

EE provides students with tools with which to evaluate the environmental consequences of messages communicated to them.

Students become more aware of media's effect on them and the behaviors adults are modeling with regard to consumption, waste, and responsibility.

Whether we can make a religion out of conservation or give that cause a messianic mission is the critical issue of this day.

Chief Justice William O. Douglas, 1972

III

Environmental Education: From the Classic to the Contemporary

TEACHERS IN YOUR WORKSHOPS may be curious about where EE originated, when it began, and what it has to do with "conservation" or "outdoor" education? "Environment" has had a presence in school programs as long as there have been schools, partly because the environment provides a rich and convenient source of examples for the study of other subjects. In this sense, EE could date back to Aristotle, Rousseau, and others interested in teaching and learning about the "real world."

But to say that EE is concerned with "learning about the outdoors" is too simplistic. With society's escalating concern about the effect of environmental quality on human health and welfare, many educators—as well as many environmentalists—believe that "environment" **must** include not only a study *of* the environment, or studying *in* the environment, but also include an understanding of how people improve their environment: education *for* the environment.[6] The following section summarizes how these different emphases arose from historical influences associated with nature study, outdoor education, and conservation education—the roots of environmental education.

The Roots of Environmental Education

Nature study, conservation education, and outdoor education—the direct antecedents of today's environmental education—began to appear in school curricula early in this century. All continue to exist today, in multiple forms and contexts. The school districts and environmental facilities in your area may use one of these definitions.

Wilbur Jackman's *Nature Study for the Common Schools* (1891) first brought the ***nature study movement*** into formal education, though Jackman had been preceded by several notable proponents, including Louis Agassiz, who insisted that his students "study nature, not books." Nature study was also the forerunner of science teaching in elementary schools, and remains one of its key elements. Indeed, Jackman has been credited with setting forth some of the early ideals for education that are still important today in elementary science education: inquiry and discovery with first-hand observation and experience (Swan, 1975).

During the utilitarian conservation movement of the early 1900s, "conservation" came to be viewed as a moral issue—a matter of right and wrong. Because education has historically been identified as a vehicle for inculcating proper behavior in children, the implicit assumption was that teaching (and preaching) about conservation in schools would improve individual and societal behavior toward the natural world. The Dust Bowl of the 1930s gave rise to ***conservation education,*** whose goal "was to awaken Americans to environmental problems and the importance of conserving various natural resources" (Nash, 1976). This focus on the environmental problems of the day was initiated by federal, state, regional, and local resource management agencies. Many of these agencies continue to see education as a tool for accomplishing their missions—when they can afford it. Often, their staff demonstrate a strong, unwavering commitment to

conservation education and are excellent resources for educators.

Traditionally, ***outdoor education*** is an approach to education, rather than a content area. Its sole specification is the place for learning—outside the school building. Its popularity grew in the 1950s with the advent of the school camping movement. The first and foremost philosopher of the field, L.B. Sharp, said, "Teach outdoors what is best taught outdoors, and indoors what is most appropriate there" (Roth, 1978).

Outdoor education has been described as a potential vehicle for all subjects of the curriculum, among them art, music, science, mathematics, and English. Specialists in this area often make use of school yards and become involved in local community studies, but usually emphasize residential camp programs. In addition to an extended hike, a pond study, or a forestry exercise (activities that are also nature study and conservation education), outdoor educators often add living history lessons on pioneer and, Native American life, cooperative group challenges, or ropes courses.

Societal Influences and Trends

The progressive education movement of the 1930s was another significant strand in the evolution of environmental education. Led by John Dewey, it advocated a child-centered and holistic approach to learning, making education more responsive to the needs of children. The focus of progressive education was "learning by doing," which incorporated learning *about* the environment while *in* the environment. It also encouraged holistic, integrated, interdisciplinary education. Progressive educators believed that education was more than preparation for life—it was a significant aspect of life.

The physical and social environment between 1950 and 1970 helped create a fertile ground for environmental education to grow from these earlier educational roots into a unique entity. After World War II, science and technology played a stronger role in establishing new expectations for a "quality of life," global communication improved, and the world's population increased exponentially.

Calls for education dealing with the environment became increasingly more persistent after the 1962 publication of *Silent Spring* (Carson, 1962), commonly identified as the event that triggered the environmental movement of the 1960s and 1970s. Adlai Stevenson's term "spaceship earth," was another graphic statement that helped people realize the powerful impact humans can have on the environment (Swan, 1975). This environmental movement differed from earlier 20th century conservation movements because it "...was far more widespread and popular, involving public values that stressed the quality of the **human** experience and hence of the **human** environment" (Hays, 1985, emphasis added).

Frustrations over environmental catastrophes, such as the Santa Barbara oil spill and a burning river in Cleveland, were symbiotically interrelated with events in the social sphere. The civil rights marches and anti-war demonstrations represented a change in the way citizens viewed the rights and responsibilities of citizenship. No longer content to be passive voters, the tumultuous times gave the more expressive citizens and advocacy groups opportunities to speak (Caldwell, 1976). The 1970 Earth Day celebrations were a landmark expression of public support for a realignment of values and a new respect for the environment.

I believe that school must represent life—life as real and vital to the child as that which he carries on in the home, in the neighborhood, or on the playground.

John Dewey

During this period of environmental activism, the U.S. Environmental Protection Agency was created and numerous federal and state laws promoting environmental quality were enacted, prominent among them the 1969 National Environmental Policy Act and the 1970 National Environmental Education Act. Both identified education as a mechanism for improving the quality of the human environment. The recent 1990 National Environmental Education Act (P.L. 101-619) reaffirms the purpose of the earlier act and focuses on schools as the place for effective environmental education, while recognizing the importance of nonformal avenues for educating citizens, communities, and the workforce.

IV

Current Environmental Education Issues in our Schools

THERE IS, OF COURSE, ALWAYS A TENSION between the goals we set and the practice we achieve. Environmental education is no different. Although there are several areas within EE where significant progress has been made (for example, developing innovative, exciting supplementary instructional resources and helping to put environmental concerns in the forefront of public consciousness), there are distinct areas of neglect. Which of the following areas are being addressed in your community? Are your teachers motivated to push EE beyond its current status? The following statements highlight a few of the challenges that EE professionals are tackling. You may find that these statements fit your district's education reform goals or that they are helpful in explaining EE's goals to others.

A child born today will be both an actor and a beneficiary or a victim in the total world fabric, and he may rightly ask: Why was I not warned? Why was I not better educated? Why did my teachers not tell me about these problems and indicate my behavior as a member of an interdependent human race?

R. Muller

Make the Environment Everyone's Concern

Environmental issues will not be satisfactorily resolved until all social and ethnic groups are involved. This means urban dwellers, recent immigrants, and people of color must be among those receiving an adequate environmental education. Everyone must be prepared to understand environmental concerns and help decide which solutions make sense for their communities. Multicultural education should include working together to resolve environmental issues.

Include EE in the Secondary School Curriculum

Elementary teachers have quickly grasped the benefit of interdisciplinary, real world, hands-on EE activities. For many, simple concepts and ecological information are sufficient. But real-world environmental issues embody a complexity that requires in-depth study and analysis. Such activities ought to occur at the secondary level, but high quality EE materials are lacking. The challenge, then, is to create materials that better meet the needs of secondary teachers and, where possible, to help secondary programs attain the flexibility needed to accommodate environmental projects and explorations. The possibilities are endless if our goal is to educate young people to work to resolve environmental issues.

Science Is Just One Part of EE

For many environmental issues, a firm grounding in scientific information is critical to understanding the problem and its potential solutions. Yet the answers to environmental problems must encompass other disciplines as well. EE's challenge is to help non-science teachers tackle environmental subjects while helping science teachers cross disciplinary lines.

EE Involves Issues and Problem-Solving Skills

If educators are to truly prepare students to work toward the resolution of issues, students need practice sorting out various perspectives, identifying resources and digging up information, and using the skills that will help them communicate and act on this information. Real problems are far better teaching tools than textbooks, and teachers don't have to go far to find them. Most communities have environmental concerns that are well worth studying. Teachers need support from administrators and communities to use the resources outside of the classroom that make their programs more meaningful.

Urban Areas Have Environmental Issues, too

Whatever issues in the local community are of concern to students are worth exploring and resolving. In urban areas, the issues of concern might be drug abuse, homelessness, and teen pregnancy. Addressing these will involve students in practicing many of the same skills as exploring the more obvious urban issues of wastewater treatment, air quality, and noise levels. And if students care more about the "social" issues in their environment, they will be more motivated to explore and act on them.

Summary

These concerns and challenges are not insignificant. In total, their message is clear: The challenge for environmental educators is to reach more people in multiple audiences with clearly presented environmental information, in appropriate depth, contexts, and formats, and with due consideration to alternative scenarios. To the extent this can be achieved, people will be individually and societally empowered to determine appropriate courses of action.

Recent projections of population growth and resource consumption patterns indicate we are moving quickly toward collapse of the ecosystem that supports life on this planet (Meadows, Meadows and Randers, 1992). We have few choices. Debating options is the equivalent of doing nothing. But that is not to say we have all the answers about what should be done. This should be a time of small experiments, of the mobilization of varied resources, and of cooperative efforts to make small but consistent changes. There is certainly no time to waste.

There are many ways in which experimentation can be done within the context of environmental education. We may agree that information about ecological systems should be taught, but what is the most effective way to communicate it? Neither gloom and doom movies nor science textbooks are likely to engage people in positive action. What else can be done? Stories, case studies, action projects, models, and field trips show promise. What else can we imagine?

If I am not for myself, who is for me? And if I am only for myself, what am I? And if not now, when?

Rabbi Hillel,
about 2,000 years ago

As we enter the 21st century, we hope it will be characterized by the sustainable use of resources, the development of bioregional communities, and the participation of more people in essential decision making. The citizens of this new era will demonstrate responsible environmental behavior. This challenge can be reached only if education takes a series of firm steps toward the environment.

Note: Much of the content of this chapter is based on earlier papers by John F. Disinger, in particular, "Environmental Education's Definitional Problem" (1983, ERIC/SMEAC Information Bulletin #2.

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Workshop Activities and Masters

V

SOME TEACHERS think EE is a pleasant way to spend a lovely afternoon outdoors. Others may think it is what the science teacher does with leaves and caterpillars. EE can include these activities, but it is certainly not limited to them. Breaking this stereotype is important, particularly to achieve a comprehensive EE program. All teachers will need to understand how they can engage their students in environmental education activities.

The following are a sample of activities from the many different EE resource materials available to teachers. They are here to offer suggestions as you design your EE teacher workshop. Please pick and choose among them to create an agenda that will meet your teachers' needs. For suggestions on designing inservice programs, see the "Designing Effective Workshops" units in the *Workshop Resource Manual.*

The following five activities can be used to begin an introductory workshop for teachers and to help them explore what EE is all about.

1 Getting Started: Two Icebreakers

Two suggestions for short introductions to an EE workshop with one handout on Master 1.

2 A Role for EE in Solving Problems

A discussion activity connecting educational opportunities with environmental realities. Overheads of the definition, objectives, and guiding principles of EE are provided on Masters 2, 3, and 4.

3 EE in the Schools

Giving EE your own rationale and explanation. Discussion questions are listed in Master 5 for an overhead transparency.

4 Is this EE?

Group discussion about selected activities and whether they match participants definition of EE. Activities are described on Master 6.

5 Why EE?

Interdisciplinary environmental learning and problem solving through a commons dilemma.

The following three activities give you some ideas of how to start discussions about some of the nuances of EE, specifically the "valuing" aspect of it.

6 Needs and Wants

Valuing activity to reveal differences in personal needs and community needs,with materials on Master 7.

7 Rare Bird Eggs for Sale

Valuing exercise to discuss collecting practices.

8 What Would You Do?

Moral dilemmas engage people in discussing why things are right or wrong. These sample scenarios (on Master 8) are about reptiles and amphibians.

The final two activities in are helpful for sparking talk about skill-building within the framework of EE.

9 Six Bits

Cooperative learning activity to solve a problem. Cards are supplied on Master 9.

10 Futures Wheel

Small group activity to develop problem-solving skills; sample on Master 10.

Although many of these activities were designed for students, you can ask teachers to reflect on the methods and strategies used to achieve certain objectives and their place in each classroom. Your workshop might continue to discuss the types of resources that teachers could tap in your region, the ways EE can be integrated into the curiculum, or how teachers might build controverisal issues into their curriculum. Each of these topics are covered in other units in the *Workshop Resource Manual.*

Activity 1

Getting Started: Two Icebreakers

Two large-group icebreakers that get participants moving and thinking together.

Objectives

To get to know other participants through interaction and humor; to begin thinking about the workshop topic.

Materials

Signs on the wall for "Like What?"; handouts from Master 1 for "Who Are We?"

Time

15 minutes for each the activity; 10 minutes to debrief.

Like What?

1

In this exercise, you will ask participants to identify how they feel about several statements. They will respond by standing at one of six response signs. For example:

Statement 1: Environmental problems in the world remind me of a . . . .
Response signs: tomato, coconut, mushroom, watermelon, banana, walnut

Statement 2: Teaching my students makes me feel like a . . . .
Response signs: flute, drum, trombone, harp, saxophone

Statement 3: Thinking about involving students in environmental activities makes me feel like a . . . .
Response signs: skunk, monarch butterfly, cheetah, groundhog, polar bear, dolphin

Statement 4: The current interest in improving education reminds me of a . . . .
tent, skyscraper, single-family home, apartment building

2

You will need to make the response signs prior to the workshop, for as many statements as you will use. Two statements are often enough. Tape the signs to the wall in layers so that all six responses for the first statement are showing and the responses to subsequent statements are hidden.

3

Ask the participants to stand in the middle of the room, and then to respond to the statement you pose by moving to a response sign on the wall which matches their feeling. As they will quickly see, they can have very silly or rather obscure connections to the answer. This should be a non-threatening way to engage people in your program.

4

Have the participants at each station briefly discuss why they are standing there, and explain their reasoning to the entire group. Give them five minutes to form an answer. Encourage humor! As you begin the next statement, remove the first set of response signs to expose the next ones.

Who Are We?

1

Distribute the handout from Master 1, which lists characteristics and qualities of workshop participants. Ask people to find someone who fits each description, and write their name on the line. Allow 15 minutes for the search, then call them back and go over the list. You can give the "winners" (people with the most blanks filled) a treat—a poster, magazine, set of stickers, etc.

2

To tailor this icebreaker to fit your needs, balance personal with professional attributes, and add a few questions that you could draw upon later. For example, if you plan to do a soil activity, you may ask who spent time on a farm, then return to that person later for a personal testimony about soil erosion.

Master 1 Who Are We?

This room is loaded with talent and experience, but few of us know very much about each other. For the next 15 minutes, identify as many workshop participants as you can who fit the descriptions below. Write their name on the appropriate blank.

Find someone who.....

1. lived overseas _____
2. visited a rain forest _____
3. speaks three languages _____
4. coaches a sport _____
5. earned a medal in a sport _____
6. lived on a farm _____
7. has his or her own ant farm _____
8. is a vegetarian _____
9. lived in a big city _____
10. is a first-generation American citizen _____
11. is a second-generation American citizen _____
12. has ancestors who fought in a war of independence _____
13. has students who fight for independence _____
14. has an unusual pet _____
15. knows the difference between good and bad ozone _____
16. climbed a mountain this year _____
17. uses public transportation regularly _____
18. has a current hunting license _____
19. has read fiction in the last three months _____
20. belonged to a cooperative _____

Activity 2

A Role for EE in Solving Problems

Small-group interaction and large-group discussion about causes of environmental problems and the role of education in finding solutions.

Objectives

To define EE and give examples of issues EE might address; to gain practice with a teaching style that engages students in critical thinking.

Materials

Blackboard or newsprint; overheads and handouts of Masters 2, 3, and 4.

Time

1 hour

Outline

1

Ask the entire group to brainstorm about environmental issues in their region today. List their examples on the board in two columns: ***resource issues*** (endangered species, land use, habitat loss, energy availability, etc.) and ***waste issues*** (air pollution, landfills, global warming, toxic waste, etc.).

If participants haven't done so, you might raise quality-of-environment issues such as homelessness, hunger, and power. These are harder to categorize as "resource" or "waste" issues. Are they "environmental" issues? Let participants consider this.

2

Organize small groups and ask them to brainstorm 5–10 minutes about the root causes of these issues—in general terms, what do people do that causes such problems? Each group should decide on five most important root causes. (Possibilities include: overpopulation, corporate greed, personal greed, ignorance, religious norms, American notions of development, short term planning, lack of community.) Someone should be taking notes in each group so that their results can be reported.

3

Reconvene the large group and ask for their ideas. As they are reported, arrange these in columns that you label: *individual, cultural, government,* and *industry.* Emphasize that many of the problems in the world today stem from a combination of these types of causes.

4

Return to the same small groups to discuss how education can improve this situation. What can children learn in schools that will help them address the root causes of environmental problems?

5

Reconvene the large group and ask again for results. Teachers often have content-oriented suggestions, e.g., "teach ecology," "teach about consequences of actions." Try to guide the responses to broader educational goals, e.g., values, problem-solving skills, responsibility, political action. This time, put their answers on the board in categories: ***knowledge, skills, and attitudes.*** Help them see that schools can help empower citizens to affect changes in the ways government and businesses operate.

6

Summarize by saying that when the 265 delegates from 66 United Nations member states met in Tbilisi, Georgia, USSR in 1977 to define EE, they defined a process that is education's answer to the root causes of environmental problems. Much as this group today, they focused on the potential of education to convey knowledge, teach skills, and support attitudes and values that will help resolve these problems. Use overheads or handouts from Masters 2, 3, and 4 to review the definition and United Nations' objectives and guiding principles for EE.

Adapted from a classroom activity by William B. Stapp, University of Michigan

Master 2

Definition of Environmental Education

Environmental education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones.

Unesco Conference in Tbilisi, Georgia, USSR in 1977

Master 3

Objectives of Environmental Education from the Tbilisi Declaration, 1977

Awareness — to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge — to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of the environment and its associated problems.

Attitudes — to help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection.

Skills — to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation — to help provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

Unesco Conference in Tbilisi, Georgia, USSR in 1977

Master 4

Guiding Principles of Environmental Education from the Tbilisi Declaration, 1977

Environmental education should....

- consider the environment in its totality—natural and built, technological and social (economic, political, cultural, historical, moral, aesthetic);
- be a continuous, lifelong process, beginning at the preschool level and continuing through all formal and nonformal stages;
- be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
- examine major environmental issues from local, national, regional, and international points of view so that students receive insights into environmental conditions in other geographic areas;
- focus on current and potential environmental situations while taking into account the historical perspective;
- promote the value and necessity of local, national, and international cooperation in the prevention and solution of environmental problems;
- explicitly consider environmental aspects in plans for development and growth;
- enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
- relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years;
- help learners discover the symptoms and the real causes of environmental problems;
- emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem solving skills;
- utilize diverse learning environments and a broad array of educational approaches to teaching, learning about and from the environment, with due stress on practical activities and first-hand experience.

Unesco Conference in Tbilisi, Georgia, USSR in 1977

Activity 3

EE in the Schools

Given a scenario representing real-world constraints, small groups develop practical definitions of EE.

Objectives

To develop a definition of EE that meets teacher's goals and the school district goals.

Materials

Newsprint and marker for each group; overhead of Master 5.

Time **45 minutes**

Outline

1

After an orientation to EE (such as Activity 2 or a slide show as provided in the EE Toolbox Slide Resource Kit), ask the teachers to meet in small groups and write their own definition of environmental education—one that would work for their classroom, school, or school district. Each small group is to consider itself the EE committee for its building or district. Members were appointed by an administration that is open to EE but not yet convinced that it merits special consideration. Outline the task on newsprint, or Master 5:

1) Define EE for your district.
2) Develop several goals for EE.
3) Anticipate objections to your definitions and goals.
4) Be able to give examples of how these goals would be accomplished in practice.

2

If your participants come from different school districts, it may be difficult for them to agree on the context. Therefore, one participant from each group may "define" the situation, or you could provide one of several hypothetical situations. Several examples:

- The school board has recently been under fire from parent groups about the "intrusion of values into the school curriculum." Some members of the board will be anxious to avoid further confrontation.
- Your suggestions will be reviewed by a committee of curriculum personnel. They are considering the impact of the new state-wide assessment.
- If your goals reflect an interdisciplinary focus, they must be approved by representatives of relevant subject areas.

3

To help the groups function, it may be useful for each group to designate people to perform the following functions:

Facilitator: Keeps people focused on the task

Timekeeper: Lets people know how much time remains to complete the task

Recorder: Takes notes of the discussion; confirms accuracy

Reporter: Reports to the large group

Equalizer: Makes sure everyone has a chance to speak

4

After working for 30 minutes, ask each reporter to share his or her groups' ideas. Explore differences and similarities among them. Are your goals practical? What people or groups in your "audience" most influenced your statement of goals? Were compromises necessary?

Adapted from a workshop activity by Randy Champeau, University of Wisconsin-Stevens Point.

Master 5

EE in the Schools

You are the EE Committee of Springdale Public Schools. You are to design the goals for an EE program that will win the support of the local administration. You have 30 minutes to complete the following task:

1) define EE for your district,
2) develop several critical goals for EE,
3) anticipate objections to your proposal, and
4) be able to give examples of how these goals would be accomplished.

Activity 4

Is This EE?

A game in which participants reveal their assumptions about what topics, approaches, and philosophies are appropriate to EE.

Objectives

To gain imagery of the types of EE activities classroom teachers use; to develop a shared vision of what EE encompasses.

Materials

Either copy Master 6 and cut it into strips or make a set of cards with one example on each. (You will need one set of strips or cards for each group.)

Time: **30 minutes**

Outline

1

Arrange the participants into small groups of 3–4 people and distribute one set of strips or cards to each group. Based on the issues of which you are aware, create your own additional strips to elicit helpful discussion on the essence of EE.

2

Ask them to sort the strips into two piles: EE and Not EE. They must decide if the description on the card refers to "EE" in their minds. If it doesn't, the group must agree why. You could provide a stronger motivation for the exercise by suggesting that each group is a curriculum review committee that will determine whether these activities belong in an EE curriculum.

3

Using the set of cards in the "EE" pile, the group should define environmental education.

4

When the groups have completed their definitions, lead a discussion about what EE is and ought to be in their school systems.

- Does EE apply equally to "natural" and "built" environments?
- Is it EE just because it occurs outdoors?
- Are there important differences between EE and ecology?
- Does EE include taking action on something kids care about, even if it isn't a traditional environmental issue?
- Are discussions of values appropriate to EE? Or are they a *necessary* ingredient to EE?

Master 6

Is This EE?

1. Students organizing their own field trip to a local park.

2. Comparing the height of plants grown in the classroom in soil from a forest with plants grown in soil from a farm field.

3. Comparing the height of plants grown in the classroom in soil from a farm field, and in soil from a compost pile, and in soil from the playground.

4. Explaining why slaves were first brought to North America.

5. Taking fourth graders to the zoo.

6. Mapping the geographic range represented by the animals at the zoo.

7. Constructing an aquarium in the classroom.

8. Raising endangered fish in a classroom aquarium.

9. Writing letters to stop the use of styrofoam in the school cafeteria.

10. Writing letters to support the regulated use of sidewalks for skateboards.

11. Volunteering in soup kitchen to feed homeless people.

12. Prioritizing favorite toys or foods and analyzing the resources used in their production.

13. Exploring the influence of diet on cancer.

14. Debating the rights of young women to obtain birth control information.

15. Understanding the health effects of naturally occurring radon.

Activity 5

Why EE?

A simulation game, based on "Commons Dilemma," a middle school activity that can be informative and interesting for adults.

Objectives

To understand how an environmental education activity can convey environmental knowledge *and address* the ethics of resource conservation; to broaden one's own definition of environmental education.

Materials

One lunch bag for each four people; four peanuts or wrapped candies for each person; blackboard or newsprint.

Time **30 minutes**

Outline

1

Put 16 peanuts or candies in each lunch bag. Label the bags with the names of bodies of water (rivers, bays, oceans) to emphasize a geographical connection. Put participants into groups of four around each bag. (If you have a group of three or five, adjust the number of peanuts so that there are four per person.) Without explaining the entire simulation, simply tell the groups that they are fisherfolk who depend on their catch for survival. Ask each person to reach into the "water" and pull out his or her catch, and pass the bag around until everyone has fished for the day.

2

Record the number of fish left in each bag, on the board or newsprint, by water body (see example). Now tell everyone that fishing, eating, and surviving is not a one-shot activity. There is always tomorrow! And thankfully, fish reproduce overnight, but not out of thin air—for each fish left in the water, there will be two the next day. Since some villages will be starving, you can let them all start over and put all their fish back in the bag for the second round.

3

Again, record the number of fish left in each bag. As you begin the third round, make sure each village has doubled the number of fish left in the water from their previous round. Some villages will, no doubt, wish to increase their fish population by leaving most of their fish in the bag. Tell them their river/ocean has a carrying capacity of 16. The system is unable to support more than 16 fish.

After one or two more rounds, several villages will have settled into a pattern of harvesting eight fish, replacing eight fish "overnight," and catching eight fish the next day. Some may be trying to reach that point.

4

Lead a large group discussion about village dynamics:

- What is going on in the villages that catch eight fish?
- Did you all decide together?
- Did you listen to a leader? Why did you trust the leader?
- Could you reach this decision without communication?
- How did the dynamics of your decision making change as you received more information?

5

Ask everyone what they need to know to be able to harvest a resource sustainably (e.g., population size, carrying capacity, reproductive capacity, demand, period of cycles). When they've finished with the biological criteria, ask again what they need to be able to actually put that information into prac-

tice (e.g., leadership, communications, trust, legislation, understanding of consequences, examples of failures). If you wish to continue making this real-world point, ask what would have happened if each village shared the same ocean (and same fish) with other villages, some of whom they were at war with and some of whom they'd never met. How would they feel about adhering to their sustainable harvest? Why?

6

Summarize by saying that environmental education is the process of sharing information about the science and social science of the issues *and* of developing skills and attitudes that will enable people to seek solutions and implement them.

Chart of Fish Left in the Bag in Five Days of Fishing

Round —	1	2	3	4	5
Bay of Fundy	0	12	6	8	8
Arctic Ocean	0	2	4	4	6
S. Pacific	0	10	12	6	8
N. Atlantic	3	3	6	9	8

Adapted with permission from "Commons Dilemma," *Living Lightly on the Planet*, Grades 7–9, 1985. Through arrangement with Schlitz Audubon Center of the National Audubon Society, 1111 East Brown Deer Road, Milwaukee, Wisconsin 53217. Copyrighted material. All rights reserved.

Activity 6

Needs and Wants

Teams consider their own attitudes and values as they use cards to sort needs from wants.

Objectives

To help teachers investigate their own values; to gain experience in an activity that engages students in discussions of values.

Materials

For each pair of teachers: one set of cards from Master 7, one envelope, piece of paper, and pen or pencil

Time **30 minutes**

Outline

1

Before the workshop, duplicate the cards on Master 7 and cut them to make a complete set for each pair of teachers. Place each set in an envelope.

2

Divide the group into teams of two. Give each pair a set of cards and ask them to sort them into categories of things they "want" and things they "need." Make sure everyone is clear that a "need" is something they can't live without.

3

After sorting, discuss how pairs defined "need" and "want" as they sorted their cards. Ask if anyone changed his or her decision about a card after hearing his or her partner's explanation. Choose a few example cards and ask in which pile teachers put them. Discuss why some people may have different ideas about what is a "need."

4

Ask teachers to sort their cards into those things they need to survive (food, water, air, space) and strategies for getting those things (transportation, money). Then lead a discussion from these questions:

- If they had the things they absolutely needed, but none of the things they wanted, how would they feel?
- What do we need to be happy? Is this the same for everyone?
- What does a community need to stay healthy?
- How are community needs different from individual needs?

5

Follow up on the activity by asking teachers to reflect on this exercise and discuss in groups of four:

- What questions would be difficult for students to discuss?
- How could they help students feel good and accept differences?
- Does this activity provide a basis for discussing values and attitudes?

Adapted with permission from "Needs and Wants" *The California State Environmental Education Guide*, Hayward, CA: Alameda County Office of Education, 1988.

Master 7

vegetables	fruit	clothes
electricity	medicine	yard
water	bicycle	computer
insects	candy	grass
college	bread	quiet
friends	car	milk
television	sun	home
money	warmth	rain
hospital	police	park
taxes	job	school
store	telephone	movies
family	eggs	air
music	church	jewelry

Activity 7

Rare Bird Eggs for Sale

A small- and large-group discussion of conservation ethics.

Objectives

To help teachers investigate their values; to gain expereince in an activity that engages students in discussions of values.

Materials

paper and pencil

Time **20–30 minutes**

Outline

1

Ask teachers to brainstorm a list of the sorts of collections people make, as individuals and in museums (rocks, feathers, bones, stamps, matchbooks, photographs, butterflies, bird eggs, pine cones, zoo animals, plants in botanical gardens, animal skins, etc.). It may be interesting to also discuss why such collections exist: to study, to decorate, to make money, to keep pets, etc.

2

Divide the group into smaller groups of 4–5 and give each 15 minutes to decide whether collections of these items should be:

a) completely unregulated;

b) allowed but regulated (and how the collection should be limited); or

c) never collected.

3

After the small groups present their lists and explain their reasoning to the full group, ask the teachers to discuss:

- Which of their students' attitudes and values will be underneath this activity?
- What else could they ask the students to help uncover these attitudes and values?
- How can they help students discuss differences of opinion with respect?
- Should one group try to convince another of the "correct" view of collections?

Adapted with permission from "Rare Bird Eggs for Sale," Project WILD, pp. 35–36 of the *Secondary Guide*. © 1983, 1985, 1992 Western Regional Environmental Education Council. The original activity, written for teachers to use with students, includes background information and greater detail.

Activity 8

What Would You Do?

Short stories provide a focus for discussing moral dilemmas.

Objectives

To enable teachers to discuss constructive ways to engage students in discussions of values; to demonstrate the use of moral dilemmas to teachers.

Materials

Handouts from Master 8.

Time

30 minutes

Outline

A moral dilemma is a situation that has no clear right or wrong answer and revolves around a basic issue of morality: life/death, health, family, responsibility to self or community, etc. Teachers find them a helpful way to elicit interesting and meaningful discussion. A discussion of the reasons behind choices is often useful to students; these are opportunities to compare one's moral reasoning to others'. This activity introduces several short dilemmas that teachers can use as if they were students.

1

After you explain the point of this activity, pass out the handouts from Master 8, put teachers in groups of 4–5, and ask them to discuss each scenario and what they would do. Circulate among the groups, noting the scenarios that generate the most interesting discussion and conflicting ideas.

2

In 10–15 minutes, ask the groups to come back together and to report on their discussion of one scenario (the one you choose from listening). Ask questions of the participants to push the discussion beyond the scenario to more general values of animals:

- If it is okay to keep this animal, is it okay to keep every animal you find?
- Should everyone behave in this manner?
- Would it matter if it were a mammal or a bird?
- If children keep pets, do they gain respect for all animals?

3

After a 10 minute in-depth discussion, close the activity and ask the teachers if this could be a useful technique in their classes:

- For what grade level would this be appropriate?
- What other questions would help focus the discussion?
- How are students likely to respond to this activity?

Adapted with permission from: "What Would You Do?" in *Let's Hear it For Herps*, **NatureScope**® Volume 3, Number 4, 198?. National Wildlife Federation, Washington, D.C.

Master 8

What Would You Do?

1. Your best friend is about to go on vacation to a park in Texas. She's been reading about lizards of the West and tells you she's going to try to catch a horned toad while she's there. She tells you all about the habits of these lizards, such as what they eat, where they live, and how they defend themselves. She also explains how she'd going to take care of it when she gets it home, showing you the book she checked out from the library on how to care for lizards. What would you do?

   - encourage her to bring the lizard back so you can learn more about it too
   - tell her that you don't think it's right to take an animal out of the wild to keep as a pet
   - read more about the lizard so you can help her take care of it
   - ask her to bring you one, if she finds two
   - tell her it's illegal to collect any living thing in a park, but let her make up her own mind
   - other:_____

2. You are on a hike with your friends and older sister when your sister spots a timber rattlesnake. The snake is close to the trail, sunning itself on a rock. Your sister tells everyone to stay perfectly still, then she picks up a large stick, slowly makes her way to the snake, and kills it. What do you think?

   - your sister was right to kill the snake because it was poisonous
   - your sister shouldn't have killed the snake because the snake was sunning itself; but if the snake looked as if it might strike, she would have been right to kill it
   - all of you should have tried to walk away without harming the snake
   - your sister was right to kill the snake because it is OK to kill any snake if it gets too close to people
   - other:_____

3. You and your family visit a roadside zoo that advertised an exhibit featuring live snakes and other reptiles and amphibians. After paying $3 per person to get inside, you see that the exhibits are falling apart and the reptiles are poorly cared for. Many of the animals have no water, and others are crammed together in tiny cages. In one of the cages, a dead snake is in the corner. And the turtle tank is filthy. What would you do?

- ask to see the owner and explain how upset you are about the conditions
- not say anything because you don't want to make the people that are working there feel bad
- ask for your money back and leave
- think about it and eventually call or write a letter to an animal protection organization
- not say anything because the people who run the zoo know more about taking care of reptiles than you do
- other:_____

4. Your next door neighbor takes a trip to India and brings back presents for your family. She gives you a belt made from the skin of an Indian snake. What would you do?

- thank her but tell her you can't accept the gift because you think the belt could have been made from an endangered snake
- thank her and take the belt, even though it might have been made from an endangered snake; later talk to her about products made from endangered animals so she's not likely to buy such things in the future
- get angry with her for buying a product made with snakeskin, and tell her she shouldn't have bought something if it even had a chance of coming from an endangered animal
- thank her and wear the belt because you'd be the only person with such a neat belt
- other:_____

From:
"What Would You Do?"
in *Let's Hear it For Herps*,
NatureScope® Volume 3,
Number 4, 1987. National
Wildlife Federation, Wash
ington, D.C.

Activity 9

Six Bits

A game in which participants cooperate to use individual information to solve a group problem.

Objectives

To develop cooperative skills; to discuss how to modify activities to enhance group skills; to discuss how individual differences in cooperative, group, and leadership skills enhance or detract from solving a problem.

Materials

Handouts from Master 9.

Time

30 minutes

Outline

In this activity, groups of six people will have bits of information that are required to answer a question. This and similar exercises can be created by splitting up the facts in a story problem or puzzle so that each person has some but not all of the information. After groups have solved the problem, it is particularly interesting to discuss how the groups differed in their approaches to the problem and the solution. To set up this part of the activity, you may wish to use a minimum of introduction and direction. Minimal directions forces the group to figure out how and what to communicate and allows atypical leadership patterns to emerge.

1

Before the activity, duplicate the cards on Master 9 so that each person will get one card; every six people will have one set of cards. Divide teachers into small groups of six and distribute one set, face down, to each group.

2

Instruct the groups to distribute one card to each person, face down. Explain that one card in their group has a question on it; they are to use the information on all the cards to solve the problem. Resist giving them more information, but if necessary, explain that every card in their group is slightly different, and although they cannot show someone their card there are other ways of conveying that information.

3

Circulate around the room and notice how groups are proceeding.

4

When the groups have solved the problem, review the "correct" answer and then ask some of the following questions. Use them to lead a discussion about what they just did, they skills they used, and why these skills are important to cultivate among students:

- How did leadership unfold at the beginning of the activity? Did the leadership continue or change as the activity progressed? Was the person with the question the organizer? The person with familiarity? The person with paper and pen?
- Did everyone participate equally? What might have happened if the cards could have been shown to others?
- How were decisions made?
- How effectively did the group function? What might have improved the groups' effectiveness?
- What skills were needed to solve this problem? Do students need more practice developing these skills?

Adapted with permission from "Six Bits" from *Environmental Education Activities Manual* by William B. Stapp and Dorothy A. Cox, Dexter, MI: Thomson-Shore, 1979; and "Jungle Sleuths" in *Rain Forests: Tropical Treasures*, NatureScope® Vol. 4 No. 4., 1989. National Wildlife Federation, Washington, D.C.

Master 9 Six Bits Cards

1

You may not show this card to anyone in the group.

Durian tree flowers are white.

Hermit hummingbirds have long bills.

Bats are usually attracted to musty-smelling flowers.

2

You may not show this card to anyone in the group.

Brownea tree flowers are bright red.

White flowers are easier to see at night than dark-colored flowers.

A flying fox is a large bat.

3

You may not show this card to anyone in the group.

Brownea tree flowers have no scent.

Hawk moths and flying foxes are active at night.

Durian trees grow in southeast Asia.

4

You may not show this card to anyone in the group.

Angraecum orchids have sweet-smelling flowers.

Hawk moths have a long tongue that they can uncoil.

Durian fruits are a delicious treat, but only to some people.

5

You may not show this card to anyone in the group.

Angraecum orchids are white.

Durian tree flowers are musty smelling.

Hermit hummingbirds are active only during the day.

6

You may not show this card to anyone in the group.

Which flower is pollinated by which animal?

The nectar in *Angraecum* orchids is located at the end of a tube that may be 12 inches long.

Durian tree flowers and *Angraecum* orchids open only at night.

Activity 10

Futures Wheel

A small-group activity in which participants generate and compare alternate visions of the future.

Teacher Objectives

To demonstrate how teachers might develop problem-solving skills among students; to discuss individual differences in cooperative, group, and leadership skills and how those differences enhance or detract from solving a problem.

Materials

Overhead or a large chart from Master 10; newsprint or large paper and markers for each group.

Time **30 minutes**

Outline

The act of problem solving involves many different skills, one of which is looking ahead to a variety of scenarios and evaluating them. This activity helps develop that skill of visioning a future and comparing positive and negative aspects of several futures.

1

Distribute paper and markers to each small group of four to six teachers. Give them an event, idea, or trend to write in the center of the paper. (Although classroom groups may be assigned different events for the center of their wheels, the comparative discussion may be richer if all groups of teachers start from the same place.) Use the sample wheel from Master 10 as a model, if appropriate.

2

Ask them to consider the possible consequences of this event, both negative and positive, and write these results in a circle around the initial event. Connect the initial idea to the consequences with a single line.

3

Then continue to consider consequences of each consequence, attaching these ideas to the previous with an additional line (double lines to the second-order consequences and triple to the third).

4

When a group completes its wheel, ask group members to tape it to the wall and give everyone time to review all the wheels. Then engage the group in a discussion of the process with questions like:

- What similarities do you see in the different wheels? What differences?
- Why do these differences exist?
- What problems did you have trying to imagine the future? What additional information would have been helpful?
- What other factors might influence the future of these events?
- How might the consequences interrelate in ways our wheels do not show?
- Of the futures displayed here, which would you choose?
- If there are negative consequences to a particular future, how might these be mitigated?
- What grade level could complete this activity successfully?
- What other ways might you use a Futures Wheel?

Master 10

Sample Futures Wheel

Resources

VI

Ahlgren, Andrew and F. James Rutherford 1993 "Where is Project 2061 Today?" *Educational Leadership* May, pp. 19–21.
The authors describe Science for All Americans and Project 2061. These projects, curriculum planners, decide what students should eventually know what can be achieved during grades 2, 5, 8, and 12. These concepts an d processes that students should understand are components of science literacy.

Braus, Judy and David Wood. 1993. *Environmental Education in the Schools: Creating a Program that Works*. Washington: Peace Corps Information Collection and Exchange.
An excellent resource for teachers looking for a rationale and procedure for building EE into their classroom. Includes sample activities for students. Available from:
NAAEE
P.O. Box 400
Troy OH, 45373
513 676-2514

Disinger, John. 1983. "Environmental Education's Definitional Problem" in ERIC Clearinghouse for Science, Mathematics and Environmental Education, Information Bulletin No. 2.
Discusses some of the forerunners of environmental education and different definitions of environmental education.

Getting Started: A Guide to Bringing Environmental Education into Your Classroom. David Bones, ed. 1994. National Consortium for Environmental Education and Training.
A sourcebook of ideas, organizations, curricula, and programs in environmental education with short stories about classroom teachers and how they conduct environmental educationprograms in their schools. Available for $9.95 from NCEET: 313 998-6726.

Hungerford, Harold R. 1987. "Environmental Education and Student Behaviors," in Trends and Issues in Environmental Education: EE in School Curricula, John F. Disinger ed. Columbus, OH: ERIC/SMEAC, 25-38.

Hungerford, Harold R., R. Ben Peyton, and Richard Wilke. 1980. "Goals for Curriculum Development in Environmental Education," Journal *of Environmental Education*. 11(3), 42-47.

McInnis, Noel and Don Albrecht (editors). 1975. *What Makes Education Environmental?* Lexington, KY: Data Courier.
An old but useful resource for defining and thinking about environmental education.

Roth, Charles E. 1993. *Environmental Literacy: Its Roots, Evolution and Directions for the 1990's*. Columbus OH: ERIC/SMEAC.

Stapp, William B. et. al. 1969. The Concept of Environmental Education. *Journal of Environmental Education* 1:1 30-31. One of the first explicit definitions of environmental education.

Van Matre, Steve. 1984. "Environmental Education: Mission Gone Astray" excerpts from a speech, The Institute for Earth Education.
Van Matre claims that environmental educators have "lost a clear sense of our direction and our mission" and challenges educators to work towards creating clear environmental programs – rather than supplements to curriculum–and then securing them in schools.

Wilke, Richard J. (editor). 1993. *Environmental Education Teacher Resource Handbook*. Millwood NY: Krause International. A rich resource for teachers and administrators who are developing an EE program in their school district, with information on assessment, definition, curriculum development, and resources.

United Nations Educational, Scientific, and Cultural Organization. 1978. Final Report, *Intergovernmental Conference on Environmental Education*, Organized by Unesco in Cooperation with UNEP, TBILISI, USSR, 14-26 October 1977. Paris, France: Unesco ED/MD/49.

Workshop Resource Manual in the **EE Toolbox**. 1994. NCEET. A series of eight additional units for teacher educators that assist them in designing and conducting environmental education in-service programs that help meet some of the challenges in EE today. Contact NCEET at 313 998–6726.

Endnotes

[1] There is an extensive literature dealing with the development of higher-order skills through education. A 1992 paper by John Disinger and Robert Howe, in their occasional Environmental Education Research News column in the British journal *The Environmentalist*, summarizes interrelationships of these skills with environmental education.

[2] For examples, Harold R. Hungerford and Trudi L. Volk (1990, "Changing Learning Behavior through Environmental Education, *Journal of Environmental Education*, 21(3), 8–21) maintain that the purpose of environmental education is to foster responsible environmental behavior through the development of problem-solving skills, while Bob Jickling (1991, "Environmental Education, Problem Solving, and Some Humility Please," *The Trumpeter*, 8(3), 153–155) argues that such a goal is overstated.

[3] Charles E. Roth introduced the term "environmental literacy" in June 1968, in an article in *Massachusetts Audubon*. This discussion in this paper is based on his 1992 monograph, *Environmental Literacy: Its Roots and Directions in the 1990s* (Columbus, OH: ERIC/SMEAC).

[4] Harold Hungerford, his colleagues, students, and former students, have for several years investigated and published extensively on the concept and dimensions of responsible environmental behavior. The discussion here relies heavily on summaries of their published reports, in particular on Hungerford's 1987 "Environmental Education and Student Behaviors."

[5] These statements are derived from several sources, including suggestions from Edward J. McCrea, executive director of the North American Association for Environmental Education, and discussions with participants at the Association for Supervision and Curriculum Development's Annual Conference in 1993.

[6] The "in/about/for" analysis was initiated in 1972 by Arthur M. Lucas in his 1972 Ph.D. dissertation *Environment and Environmental Education: Conceptual Issues and Curricular Implications* (Ann Arbor: University Microfilms International, 73-11531), and continues to offer a useful approach to definitions of goals and operational procedures in environmental education.

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